

Amendments to the Specification

A new paragraph has been added to page 1 before line 1.

This application is a division of Application No. 10/059,440 filed January 31, 2002.

The paragraph starting at page 2, line 4 has been amended as follows.

A known ink discharge method of an inkjet printer is to heat resistances or resistors by electric power applied to a printhead and discharge ink from a micro-nozzle by utilizing bubbles generated within the nozzle serving as an ink channel. In this case, to drive a printhead for discharging ink, a constant DC voltage is applied to the resistances to turn on/off switch devices connected in series to the resistances, thereby supplying the amount of power necessary for ink ejection to the heater resistances.

The paragraph starting at page 2, line 21 has been amended as follows.

Since an arbitrary printhead is mounted as described above, the amount of head driving power necessary for discharging ink in a single discharge operation is controlled in order to stabilize the printing operation regardless of a variation in resistance values of the heater resistances in the printhead. Conventionally, the amount of electric power is controlled by detecting a variation of the heater resistance values based on a

resistance value of a detection resistance, provided within the printhead that includes the heater resistances, then inputting the variation data to a control circuit provided on a main board fixed to a printer main body, and adjusting a head driving pulsewidth transmitted from the main board to the printhead.

The paragraph starting at page 18, line 7 has been amended as follows.

Fig. 9 is a perspective view showing the outer appearance of an inkjet printer IJRA as a typical embodiment of the present invention. Referring to Fig. 9, a carriage HC engages with a spiral groove ~~5004~~ 5005 of a lead screw ~~5005~~ 5004, which rotates via driving force transmission gears 5009 to 5011 upon forward/reverse rotation of a driving motor 5013. The carriage HC has a pin (not shown), and is reciprocally scanned in the directions of arrows a and b in Fig. 9. An integrated inkjet cartridge IJC which incorporates a printhead IJH and an ink tank IT is mounted on the carriage HC.

The paragraph starting at page 19, line 19 has been amended as follows.

The capping, cleaning, and suction recovery operations are performed at their corresponding positions upon operation of the lead screw ~~5005~~ 5004 when the carriage reaches the home-position side region. However, the present invention is not limited to this arrangement as long as desired operations are performed at known timings.

The paragraph starting at page 35, line 9 has been amended as follows.

Wirings on the power supplying side are also divided into blocks, and the wiring of each of these blocks ~~meet~~ meets at point b, thereby connecting to the power supply terminal 130 through the common wiring 172.

The paragraph starting at page 41, line 14 has been amended as follows.

Referring to Fig. 15, a wiring resistance on the power source side is r_h , a resistance in the common wiring portion is r_{g1} and a resistance in the uncommon wiring portion is r_{g2} on the GND side. A load current is I_0 , which varies in accordance with the number of nozzles driven simultaneously. An output voltage of the DC/DC converter 900 is V_0 , and a voltage applied to the heater resistances of the printhead is V'_0 .

The paragraph starting at page 47, line 7 has been amended as follows.

Note that in the foregoing embodiments, although the description has been provided based on the assumption that a droplet discharged by the printhead is ink and that the liquid contained in the ink tank is ink, the contents are not limited to ink. For instance, the ink tank may contain ~~processed~~ processing liquid or the like, which is discharged to a print medium in order to improve the fixation or water resistance of a printed image or to improve image quality.

The paragraph starting at page 47, line 24 has been amended as follows.

As the typical arrangement and principle of the ink-jet printing system, one practiced by use of the basic principle disclosed in, for example, U.S. Patent Nos. 4,723,129 and 4,740,796 is preferable. The above system is applicable to either one of so-called ~~an~~ on-demand and a continuous ~~type~~ types. Particularly, in the case of the on-demand type, the system is effective because, by applying at least one driving signal, which corresponds to printing information and causes a rapid temperature rise exceeding nucleate boiling, to each of electrothermal transducers arranged in correspondence with a sheet or liquid channels holding a liquid (ink), heat energy is generated by the electrothermal transducer to effect film boiling on the heat acting surface of the printhead, and consequently, a bubble can be formed in the liquid (ink) in one-to-one correspondence with the driving signal.

The paragraph starting at page 49, line 3 has been amended as follows.

As an arrangement of the printhead, in addition to the arrangement as a combination of discharge nozzles, liquid channels, and electrothermal transducers (linear liquid channels or right angle liquid channels) as disclosed in the above specifications, the arrangement using U.S. Patent Nos. 4,558,333 and 4,459,600, which disclose the arrangement having a heat acting portion arranged in a flexed region, is also included in the present invention. In addition, the present invention can be effectively applied to an

arrangement based on Japanese Patent Application Laid-Open No. 59-123670, which discloses the arrangement using a slot common to a plurality of electrothermal transducers as a discharge portion of the electrothermal transducers, or Japanese Patent Application Laid-Open No. 59-138461, which discloses the arrangement having an opening for absorbing a pressure wave of heat energy in correspondence with a discharge portion.

The paragraph starting at page 51, line 25 has been amended as follows.

In this case, ink may be situated opposite to electrothermal transducers while being held in a liquid or solid state in recess portions of a porous sheet or ~~through holes~~ through-holes, as described in Japanese Patent Application Laid-Open No. 54-56847 or 60-71260. In the present invention, the above-mentioned film boiling system is most effective for the above-mentioned inks.

The paragraph starting at page 52, line 13 has been amended as follows.

Further, the object of the present invention can also be achieved by providing a storage medium (or recording medium), storing program codes of a software realizing the above-described functions of the embodiments, to a computer system or apparatus, reading the program codes, by a CPU or MPU of the computer system or apparatus, from the storage medium, then executing the program. In this case, the program codes read from the storage medium realize the functions according to the embodiments,

and the storage medium storing the program codes constitutes the invention. Furthermore, besides aforesaid functions according to the above embodiments ~~are~~ being realized by executing the program codes which are read by a computer, the present invention includes a case where an OS (operating system) or the like working on the computer performs a part of or the entire processes in accordance with designations of the program codes and realizes functions according to the above embodiments.

The paragraph starting at page 53, line 6 has been amended as follows.

Furthermore, the present invention also includes a case where, after the program codes read from the storage medium are written in a function expansion card which is inserted into the computer or in a memory provided in a function expansion unit which is connected to the computer, a CPU or the like contained in the function expansion card or unit performs a part of or the entire ~~process~~ processes in accordance with designations of the program codes and realizes functions of the above embodiments.

Amendments to the Abstract

Please amend the Abstract of the Disclosure as follows:

~~Printing~~ A printing apparatus ~~which~~ performs printing by scanning a carriage unit over a print medium based on information transmitted from an external apparatus. The body (53) of the carriage unit includes[[:]] a removable printhead (54) having a plurality of nozzles for discharging ink; a heat source detection unit (59) for detecting the number of heat sources driving the nozzles; and a voltage generation unit (60) for supplying a voltage to the heat sources for driving the nozzles in accordance with the number of heat sources detected by the heat source detection unit.